Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
	)	
Replacement of Part 90 by Part 68 to	)	PR Docket No. 92-235
Revise the Private Land Mobile Radio	)	
Services and Modify the Policies	)	
Governing Them	)	

COMMENTS OF HEWLETT-PACKARD COMPANY

Hewlett-Packard Company ("HP") hereby submits the following comments with respect to the Notice of Proposed Rulemaking in the above-captioned proceeding.[1]

I. OVERVIEW

The Commission's Notice presents two basic, underlying goals with respect to the "refarming" of private land mobile frequencies below 512 MHz, each of which HP wholeheartedly supports: first, to require systems that operate in these bands to be spectrum efficient; and, second, to take advantage of such spectrum efficient use, over time, to reorganize and make more compatible the allocation of frequencies among services within the bands, ultimately to improve the quality and availability of service in this crowded spectrum.

HP is concerned, however, that the Commission's proposal does not fully serve

Furthermore, the problem for ECG and other medical telemetry devices is not one that can be resolved by making their operation more efficient. In this regard, while the issue of transition time to more efficient systems is of great importance to some users of the band, for medical telemetry operations, the current proposals offer nothing to which to transition. Fundamentally, low power medical telemetry devices will be forced out of the 450-470 MHz band unless a reserved portion of the band is created for their primary use and new high power operations on or within 12.5 kHz of the 450-470 MHz frequencies currently available for low power medical telemetry devices (*see* Note 3 below) are forbidden until hospitals are given a sufficient time period to relocate those devices to the new frequencies.

II. LOW-POWER MEDICAL TELEMETRY OPERATIONS IN THE

things, the need for instantaneous, continuous and error-free transmissions precludes the use of communications techniques that can accept a certain level of error or an occasional garbled transmission that might fail to alert a monitoring nurse of a life-threatening cardiac arrhythmia or which might distort other vital signs, such as heart rate, blood gas and blood pressure.

In addition, because transmitting units are to be worn by cardiac patients, it is essential that they be lightweight and protect patients from high levels of RF exposure. Low-power operation and other design features also preserve battery life and allow frequencies to be reused by other low-power medical telemetry devices at nearby locations. The antennas that monitor the patient units must be highly sensitive to receive signals from numerous patients within short distances. Unfortunately, this also makes the receive antennas highly sensitive to interference from outside sources. Finally, given the ever increasing concern in the United States regarding rising health care costs, the system has been and must be designed to be relatively inexpensive to purchase and to allow for a long period of use without equipment replacement.

III. SUBJECT TO MINOR CLARIFICATIONS TO THE PROPOSED RULES, MEDICAL TELEMETRY DEVICES ALREADY MEET THE EFFICIENCY STANDARDS PROPOSED FOR THE YEAR 2004. REDUCING AUTHORIZED BANDWIDTH WILL NOT MAKE ECG DEVICES MORE EFFICIENT.

Working within the constraints of 12.5 kHz offset frequencies, the ECG devices developed by HP for operation in the 450-470 MHz essentially already meet the efficiency requirements proposed by the FCC to be implemented in the year 2004. See proposed rule 47 C.F.R. § 88.433 applicable to "non-standard bandwidths." Thus, the ECG transmits a digital signal at 9600 baud with an occupied bandwidth that is less than 10 kHz.

The one qualification to HP's analysis of the operation of the ECG under the proposed rules is that the product can be assured of meeting the emission mask proposed in Section 88.421(c) only when operated between 10 and 40 degrees centigrade. Because the ECG has been designed to be worn by hospital patients, it has not been necessary to prevent such out of band emissions at the more extreme

temperatures, which would be required for testing under 47 C.F.R. § 2.995.[5] It would, moreover, require an increase in the size and weight of the device and decrease in battery life to meet the proposed emission mask requirement at such extreme temperatures.

Given the ordinary use of the product, the added shielding effect of the hospital environment and ECG's low power, there is no realistic possibility that the hypothetical failure of certain ECG devices operating at extreme temperatures to exceed mask limits will interfere with other users of the band. Accordingly, HP suggests that proposed Section 88.421(c) be modified, either to include an exception for low power devices as set forth in current section 90.217, or otherwise to provide that low power devices designed to be worn by medical patients need only meet emission mask levels as measured at temperatures ordinarily maintained in hospital environments.

HP has spent years designing ECG monitors to operate efficiently within the very limited spectrum available for its use and has analyzed various options including narrowband signaling and spread spectrum technologies and found none as efficient or effective as the current high-speed digital wide band ECG technology that is being employed. Requiring a reduction in bandwidth would not make the ECG more efficient. Among other things, in order to preserve the integrity of the data signal in a narrower bandwidth, a much-higher powered, heavier, and more expensive device would be required, all of which are incompatible with cardiac patient needs.

Alternatively, a lower data rate and/or excessive error in the data transmission stream would have to be accepted for narrowband operations — but none of this can be accepted without risking patients lives. Higher-powered units would also limit the ability for frequencies to be reused within fairly close proximity as is now the case, thereby creating greater frequency demands for such medical telemetry devices and an overall loss in spectrum efficient use.

IV. INTERFERENCE FROM HIGH POWER SYSTEMS OPERATING AT 12.5 kHz SEPARATION FROM LOW POWER OFFSET FREQUENCIES IS ALREADY A MAJOR PROBLEM. THE PROPOSED NARROWBAND CHANNELIZATION PLANS WOULD CREATE AN INTOLERABLE LEVEL OF INTERFERENCE FOR ECG AND OTHER MEDICAL TELEMETRY DEVICES.

An increasing problem for hospitals employing ECG devices is interference from

unspecified number of offset channels might remain for low power operation.[6] Any reduction in the number of potentially available offset channels for ECG units, however, combined with increasing congestion in the band, would worsen the growing problem of locating an adequate number of interference-free channels for ECG and other medical telemetry technologies in frequency-congested urban areas or make it impossible. In this regard, not only is there a risk that currently available ambulatory care for heart patients likely have to be curtailed, there will be no room at all for new applications for more sophisticated medical telemetry devices that are currently being developed. These new technologies would increase the types and amount of data delivered to give doctors a more complete picture of a patient's physiological signs.

V. A PORTION OF THE BAND SHOULD BE RESERVED FOR LOW POWER MEDICAL TELEMETRY OPERATIONS.

After reviewing the Commission's proposals and other proposals that have already been filed in this proceeding and participating in panel discussions regarding refarming, which have been sponsored by the FCC, HP is convinced that the only long-term viable solution for ECG and other medical telemetry technologies in the 450-470 MHz band is to carve out a portion of the band for low-power medical telemetry use. In this regard, HP finds some elements of NABER's proposal to realign the band so that like services can operate on contiguous bands[7] to be attractive. However, rather than simply dividing the band in accordance with the business purpose of the use; e.g., various types of industrial, land transportation, and other businesses, HP urges that a specific carve-out must be created for low-power medical telemetry devices. In this regard, such devices are no more compatible with voice communications from hospital ambulances than with those from taxis.

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6 See "Consensus Plan" at 8.

7 HP agrees with NABER that such contiguous bands will be helpful for wide-band systems which, as NABER points out, may be better suited (and more efficient) for some applications than narrowband channels. See NABER "White Paper," filed May 4, 1993, at 1-2. There appears to be some inconsistency in NABER's recognition that wide band channels may be the most appropriate and efficient method for the delivery of digital data services and its proposal that the Commission cease authorizing applicants for

Furthermore, NABER's emphasis on the license application and renewal process as a means of migrating systems and for establishing areas of exclusive use will not work for medical telemetry devices. Among other things, such devices, because of their low-power and lack of interference causing potential, have been generally delicensed.[8] Furthermore, the nature of the use of these devices by individual hospitals is not one that fits within the parameters usually employed for considering the loading of mobile units on an individual system. Accordingly, HP urges that a portion of the 450-470 MHz band sufficient to meet the growing requirements for low power ECG and other medical telemetry systems be established for the primary operation of this essential life-saving technology.

Only after a protected band for low power medical telemetry technology is established can one sensibly consider a transition period for existing systems to be grandfathered (which must include protection from new sources of destructive interference) and new systems to be developed. It is HP's experience that hospitals often use products such as ECGs for 15-20 years. Given the increasing concerns regarding health care costs, there is no reason to believe that such period of anticipated use will be shortened. Balancing health care costs against other public interest benefits of refarming, HP urges that at least 10, and preferably 15 years be allowed for transition. However, as noted above, the time for transition cannot begin until there is a place in the band to which to migrate where medical telemetry technology can exist without suffering interference from other incompatible services.

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[8] 47 C.F.R. § 90.267(a)(7) adopted by Order, 7 FCC Rcd 5464 (1992). HP notes that there appears to be a typographical error in proposed 47 C.F.R. § 88.1299(b) that would permit mobile stations operating at 10 mW or less output power to do so without separate license authorizations. The Notice (¶26) proposes that delicensing apply to stations at 20 mW or less, which conforms with the exception that is applicable to hospitals.

VI. CONCLUSION

The Commission's refarming proceeding offers great promise for finally establishing an interference-free home for ECG and other essential life-saving medical telemetry technologies. HP urges that this promise be fulfilled.

Respectfully submitted,

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